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Storage, presented by the editor, there is an account of *Cold storage* by L. C. Corbet, and of *Refrigerator cars* by J. H. Hale.

Aside from the taxonomic presentation of many genera, perhaps the most interesting articles to botanists are *Teratology*, presented by C. R. Barnes; *Trees*, presented in all their aspects by various writers; and *Winter protection*, described and illustrated by W. C. Egan and B. M. Watson.

Professor Bailey is to be congratulated upon the completion of this work, especially upon the peculiar features it possesses in comparison with the ordinary cyclopedias dealing with horticultural material. Its chief features, as they stand out in the mind of the editor, are that it represents a living horticulture, rather than a compilation of odds and ends selected from other encyclopedias; that it contains synoptical keys that enable the reader to name the species; that the leading articles are signed and represent the contributions of more than 450 persons; and that throughout the whole presentation one detects no rigid conception of plant, forms, but feels the drift of an evolutionary motive. That such a work should have been begun, so far as actual writing is concerned, in January 1899, and the last proof read December 31, 1901, speaks well for the organizing power and the capacity for work of its editor and his staff. The statistics show that the total number of entries is 4357; the number of genera described is 2255; the number of species fully described is 8793, of which 2419 are native to North America north of Mexico.—J. M. C.

Physiology in the laboratory.

TO STUDY the plant in action is to become acquainted with the most interesting phase of the science of botany. It is a part of the subject that appeals especially to the young student. But to make intelligent progress, to look into the more recondite processes without elaborate apparatus, and to proceed without undue loss of time and check to enthusiasm requires a good guidebook. Even under an excellent instructor a handbook is advantageous. A work that meets the requirements for a laboratory manual of physiology for the beginner has recently been issued from the press of Longmans, Green & Co., prepared by Dr. Daniel T. MacDougal,[4] director of the laboratories of the New York Botanical Garden.

The work is perspicuous, concise, up to date, and requires only simple apparatus, easily obtained by most colleges and high schools, and in part no apparatus at all. The whole ground of physiology is covered: growth and growth movements, reproduction and germination, movements of gases and liquids, nutrition of green plants, parasites and saprophytes, respiration, digestion, stimulation, and correlation.

The text is more than a set of directions for performing experiments, for it gives a readable account of many topics, and incidentally furnishes much information upon the general subject of physiology. The cuts are especially serviceable in showing how the student is to proceed. In short, the work comes as near as possible to the perfect manual, which tells enough to be helpful and attractive, and yet leaves the student to ascertain the actual facts for the most part by his own observations upon the living plant or in introductory demonstrations.

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[4] MACDOUGAL, DANIEL TREMBLY, Elementary plant physiology. New York: Longmans, Green & Co. 1902. 12mo, pp. xi+138, with 108 text cuts.

The work is all the more satisfactory for being the outgrowth of two preliminary works, the first published in 1894 and the second in 1895, both now out of print.—J. C. ARTHUR.

MINOR NOTICES.

THE SECOND FASCICLE of Ohio fungi, distributed by Professor W. A. Kellerman, of Columbus, O., has been issued, and is larger than the preceding one. It contains twenty-six numbers, of which seven belong to the genus Puccinia, five to Uromyces, three to Ustilago, two each to Gymnoconia and Gymnosporangium, and one each to Aecidium, Gloeosporium, Melampsora, Piggotia, Polystictus, Stereum, and Urocystis. The excellent preparation and fullness of material is maintained. The first fascicle was described in the March number of this journal (p. 239). Although these fascicles are intended for distribution to working mycologists, the author has consented to sell a very limited number at one dollar each.—J. C. ARTHUR.

THE SECOND EDITION[5] of Frost's *Laboratory guide in elementary bacteriology* (8vo) is much more convenient in form than the first (4to) edition.[6] It combines the features of a laboratory outline and of a notebook, blank pages and diagrams being inserted for records of the student's observations. The author recognizes the desirability of uniformity in cultural methods, and gives in addition to the ordinary laboratory methods of preparation of culture media those recommended by the committee on methods of the American Public Health Association. Part I is devoted to general bacteriology, with introductory chapters on morphology, physiology, and taxonomy. In the latter a number of valuable descriptive adjectives, similar to those suggested by Chester, are introduced. Part II deals with medical bacteriology, with appended chapters on animal inoculation and the examination of pathological tissues and fluids. In connection with each exercise are references for the student, both to the principal texts and to original articles on the subject under consideration. The guide is admirably planned and will form a welcome aid in the teaching of bacteriology.—E. E. IRONS.

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[5] FROST, WILLIAM DODGE, A laboratory guide in elementary bacteriology. Second revised edition, pp. x + 355. Madison, Wis.: Published by the author. 1902.

[6] See review in BOT. GAZ. **31** : 439. 1901.